IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Gitis et al.		
Assignee:	Maxtor Corporation		
Title:	MAGNETIC HEAD SLIDER WITH RESISTANCE TO DEBRIS ACCUMULATION		
Serial No.:	Unknown	Filed:	Herewith
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Atty. Docket No.:	3123-149-1-1		

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Dear Sir:

The captioned-application is a divisional of pending prior U.S. Application Serial No. 09/491,284, filed January 26, 2000, which is a continuation of U.S. Application Serial No. 08/161,234, filed December 2, 1993, which is a continuation-in-part of U.S. Application Serial No. 07/992,270, filed December 14, 1992 (abandoned). The '234 application incorporated by reference the '270 application at page 12, lines 1-4. The captioned-application is based on and only contains subject matter disclosed in the '270 application. Therefore, the effective filing date for the captioned-application is December 14, 1992. Please amend the captioned-application, based on the '270 application, as follows.

In the Abstract

Replace the paragraph at page 15, lines 2 to 8 with the following paragraph:

A magnetic recording head for reading and writing information with respect to a rotating disk medium includes a pad having a working surface which contacts the recording medium. The pad has a leading edge and a trailing edge with the leading edge facing in the general direction of relative motion between the head and the medium. The leading edge has a narrower width than the trailing edge so as to reduce the effect of debris accumulation at the disk-head interface. The narrower leading edge allows the head to deflect oncoming debris as the head traverses the surface of the rotating magnetic medium.

In the Specification

Insert the following paragraph at page 2, line 3:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional of U.S. Application Serial No. 09/491,284, filed January 26, 2000, which is a continuation of U.S. Application Serial No. 08/161,234, filed December 2, 1993, which is a continuation-in-part of U.S. Application Serial No. 07/992,270, filed December 14, 1992 (abandoned).

Replace the paragraph at 2, lines 12 to 22 with the following paragraph:

Researchers working in the magnetic recording industry have recently begun focusing their efforts on developing thin film heads having a so-called integrated head/flexure/conductor structure for reading and writing of information to a disk medium. For example, such a magnetic head structure is disclosed in U.S. Patent No. 5,041,932. In this type of recording technology, a magnetic pole element is embedded within the body of the magnetic recording head. Advanced performance is achieved in these types of magnetic recording heads by including a contact pad which is in non-catastrophic, continuous sliding contact with the surface of the recording medium. The contact pad includes a working surface portion which is extremely small -- on the order or about 20 X

30 microns. The working surface portion of the contact pad actually touches the disk during normal operation.

Replace the paragraph at page 3, line 25 to page 4, line 13 with the following paragraph:

It should be understood that in the conventional type of magnetic recording head which flies above the surface of the disk (i.e., near-contact recording system), the working surface which touches the disk normally comprises two or more rails having flat bottom surfaces. For example, sliders of this type are disclosed in U.S. Patent Nos. 4,870,619; 4,961,121; 4,926,274; and 4,709,284. To increase the hydrodynamic lifting force, many sliders have a front taper as described in U.S. Patent No. 4,939,603. Other designs include a sloping working surface. In either case, the taper and/or slope are in the vertical direction; that is, perpendicular to the disk surface. Other prior art designs include the so-called slider camber and crown -- characterized by their vertical slopes in both the longitudinal and cross directions, respectively. This latter type of design is usually selected based on considerations of smaller contact area so as to reduce the problem of stiction. The drawbacks to these designs however include the requirement for a higher take-off velocity and an increased wear rate.

Replace the paragraph at page 8, lines 4 to 13 with the following paragraph:

Figure 2 illustrates another type of read/write head structure which also suffers from the problem of excessive debris accumulation at the head-disk interface. The integrated read/write head/flexure/conductor structure 20 shown in Figure 2 comprises an elongated, dielectric flexure body 22 having a pad 21 disposed at one end. A magnetic pole element is embedded within pad 21 to provide flux-coupling to the magnetic underlayer of the recording medium. Pad 21 also includes a working surface 23 which is in substantially continuous sliding contact with the disk recording medium during read/write operations. The area of the working surface is usually made to be very small

with a typical recording head of this type having a pad area of approximately 30 X 20 microns.

Replace the paragraph at page 9, lines 10 to 20 with the following paragraph:

Although Figures 3A and 3B show the entire slider being shaped in an overall triangular or V-shape, it should be understood that in some cases only the front portion or leading section of the contact pad structure may be shaped in this way. In other words, the essential characteristic of the invention is that the leading edge of the slider be shaped so as to push away debris as the head slides across the surface of the recording medium. Note that the relative direction of motion of the recording medium is shown in Figures 3A and 3B by arrow 35. Any debris present on the surface of the recording medium is diverted away from the slider-disk interface along the sides of slider 30 in accordance with the present invention. Thus, the shape of the contact pad or slider provides a means for reducing the amount of debris being brought into the friction zone by a hydrodynamic flow.

Replace the paragraph at page 9, line 21 to page 10, line 5 with the following paragraph:

Figures 4A and 4B show an alternative embodiment of the present invention in which contact pad 40 includes a leading edge 41 which has a parabolic or U-shape. Trailing edge 43 remains straight. The direction of relative motion between the contact pad and the medium is shown in Figures 4A and 4B by arrow 45. Once again, it is appreciated that the parabolic or U-shaped leading edge faces the direction of sliding. Note also that it makes little difference whether the curved leading edge is actually "U"-shaped, parabolic, hyperbolic, or described by some other mathematical function. It should also be understood that in the embodiments of Figures 3A, 3B, 4A, and 4B, it may be desirable to taper the leading edges in order to improve the sliding and/or flying characteristics of the head.

Replace the paragraph at page 10, line 25 to page 11, line 6 with the following paragraph:

Figures 6A-6C illustrate other alternative embodiments of the present invention wherein the magnetic recording head flies above the surface of the disk. Each of the sliders of Figures 6A-6C is shown having a plurality of rail members, with each rail member providing an air-bearing surface that is approximately parallel to the surface of the disk. In each case, the leading edges of the rail members is shaped so as to reduce the problem of debris accumulation at the disk-slider interface in a manner consistent with the explanation above.

Replace the paragraph at page 11, lines 16 to 21 with the following paragraph:

Similarly, in Figure 6B, slider 70 includes rail members 72 each having a leading edge 75 and trailing edge 74. In the case of slider 70, the leading edge portion of the rail members are again shaped to have a "knife-edge" profile, wherein the leading edge 75 is again narrower than the trailing edge 74. The only difference between the embodiment in Figure 6A and that shown in Figure 6B is that in Figure 6B, the narrower leading edge is symmetrical about the center of the rail.

Replace the paragraph at page 11, line 22 to page 12, line 3 with the following paragraph:

Figure 6C shows a third variation of the basic concept of the present invention wherein slider 80 includes rail members 82 each having a leading edge 85 which is narrower than trailing edge 84. In the case of slider 80, leading edge 85 is "U-shaped" to deflect oncoming debris thereby preventing it from accumulating at the slider-disk interface. It is appreciated that the leading edge 85 of rail members 82 may also be parabolic, hyperbolic, or some other curved surface which can be represented by a mathematical function.

In the Claims

Cancel claims 1-4 without prejudice or disclaimer to the subject matter recited therein.

Amend the following claims:

5. (Amended) A slider for supporting a magnetic transducer above the surface of a rotating disk medium, said slider comprising:

a body;

a plurality of rail members extending outward from said body in a direction towards said medium, each of said rail members having a leading and a trailing edge with said leading edge facing in the general direction of relative motion between said transducer and said medium, and wherein said leading edge has a narrower width as compared to said trailing edge;

each of said rail members also having an air-bearing surface which is alternately brought into contact with and separated from said surface of said medium, said air-bearing surface being generally parallel to said surface of said medium.

8. (Amended) The slider of Claim 5 wherein each of said rail members has a parabolic shape, with the narrow part of said parabolic shape pointing in said direction.

9. (Amended) The slider of Claim 5 wherein said leading edges are tapered away from said air-bearing surfaces to create a lifting effect to maintain said body at a predetermined height above said surface of said medium.

Add the following claims:

10. A slider, comprising

a transducer for transferring information to and from a rotating disk medium during read and write operations; and

first and second rails, wherein each of the rails has a leading edge that faces into a general direction of relative motion between the slider and the medium, a trailing edge that faces away from the direction, and an air-bearing surface, the leading edge has a width that is substantially perpendicular to the direction, the trailing edge has a width that is substantially perpendicular to the direction, and the width of the leading edge is substantially narrower than the width of the trailing edge.

11. The slider of Claim 10 wherein each of the rails includes a V-shaped portion, a narrow part of the V-shaped portion is the leading edge and a wide part of the V-shaped portion is spaced from the leading edge.

12. The slider of Claim 11 wherein the wide part of the V-shaped portion is the trailing edge.

13. The slider of Claim 12 wherein a thickness of the narrow part of the V-shaped portion is substantially identical to a thickness of the wide part of the V-shaped portion.

14. The slider of Claim 12 wherein a thickness of the narrow part of the V-shaped portion is substantially less than a thickness of the wide part of the V-shaped portion.

15. The slider of Claim 11 wherein the wide part of the V-shaped portion is spaced from the trailing edge.

16. The slider of Claim 15 wherein a distance between the narrow part of the V-shaped portion and the wide part of the V-shaped portion is substantially less than a distance between the wide part of the V-shaped portion and the trailing edge.

17. The slider of Claim 10 wherein each of the rails includes a U-shaped portion, a narrow part of the U-shaped portion is the leading edge and a wide part of the U-shaped portion is spaced from the leading edge.

18. The slider of Claim 17 wherein the wide part of the U-shaped portion is spaced from the trailing edge.

19. The slider of Claim 17 wherein each of the rails includes a rectilinear portion between the U-shaped portion and the trailing edge.

20. The slider of Claim 10 wherein each of the rails includes a wedge-shaped portion, a narrow part of the wedge-shaped portion is the leading edge and a wide part of the wedge-shaped portion is spaced from the leading edge.

21. The slider of Claim 20 wherein the wide part of the wedge-shaped portion is spaced from the trailing edge.

22. The slider of Claim 20 wherein each of the rails includes a rectilinear portion between the wedge-shaped portion and the trailing edge, and the narrow part of the wedge-shaped portion is aligned with an inner side of the rectilinear portion and spaced from an outer side of the rectilinear portion.

23. The slider of Claim 10 wherein each of the rails includes a parabolic-shaped portion, a narrow part of the parabolic-shaped portion is the leading edge and a wide part of the parabolic-shaped portion is spaced from the leading edge.

24. The slider of Claim 23 wherein the wide part of the parabolic-shaped portion is spaced from the trailing edge.

25. The slider of Claim 23 wherein each of the rails includes a rectilinear portion between the parabolic-shaped portion and the trailing edge.

26. The slider of Claim 10 wherein each of the rails has a hyperbolic-shaped portion, a narrow part of the hyperbolic-shaped portion is the leading edge and a wide part of the hyperbolic-shaped portion is spaced from the leading edge.

27. The slider of Claim 26 wherein the wide part of the hyperbolic-shaped portion is spaced from the trailing edge.

28. The slider of Claim 26 wherein each of the rails includes a rectilinear portion between the hyperbolic-shaped portion and the trailing edge.

29. The slider of Claim 10 wherein the air-bearing surface is a flat continuous surface.

30. The slider of Claim 10 wherein the slider has a leading edge that faces into the direction and a trailing edge that faces away from the direction, the leading edge of each of the rails extends to the leading edge of the slider, and the trailing edge of each of the rails extends to the trailing edge of the slider.

31. The slider of Claim 10 wherein the slider has first and second outer side surfaces, each of the rails has an outer side surface, a portion of the outer side surface of the first rail extends to the first outer side surface of the slider, and a portion of the outer side surface of the second rail extends to the second outer side surface of the slider.

32. The slider of Claim 10 wherein each of the rails has an inner and outer surface and the leading edge is symmetrically disposed between the inner and outer surfaces.

33. The slider of Claim 10 wherein each of the rails has an inner surface and outer surface and the leading edge is asymmetrically disposed between the inner and outer surfaces.

34. The slider of Claim 10 wherein each of the rails has a uniform thickness.

35. The slider of Claim 10 wherein each of the rails has a non-uniform thickness.

36. The slider of Claim 10 wherein each of the rails deflects debris on the medium away from the air-bearing surface.

37. The slider of Claim 10 wherein each of the rails alternately contacts and moves away from the medium during the read and write operations.

38. The slider of Claim 10 wherein each of the rails maintains near-contact with the medium during the read and write operations.

39. The slider of Claim 10 wherein each of the rails maintains a near-contact flying height in the range of 1 to 3 microinches during the read and write operations.

40. A slider, comprising:

a body;

a transducer for transferring information to and from a rotating disk medium during read and write operations; and

first and second rails that extend from the body towards the medium, wherein each of the rails has a leading edge that faces into a general direction of relative motion between the slider and the medium, a tapered width adjacent to the leading edge, a trailing edge that faces away from the direction, and an air-bearing surface that faces the medium, the leading edge, trailing edge and tapered width extend between the air-bearing surface and the body, and the leading edge is narrower than the trailing edge.

41. The slider of Claim 40 wherein each of the rails includes a V-shaped portion, a narrow part of the V-shaped portion is the leading edge and a wide part of the V-shaped portion is spaced from the leading edge.

42. The slider of Claim 41 wherein the wide part of the V-shaped portion is the trailing edge.

43. The slider of Claim 42 wherein a thickness of the narrow part of the V-shaped portion is substantially identical to a thickness of the wide part of the V-shaped portion.

44. The slider of Claim 42 wherein a thickness of the narrow part of the V-shaped portion is substantially less than a thickness of the wide part of the V-shaped portion.

45. The slider of Claim 41 wherein the wide part of the V-shaped portion is spaced from the trailing edge.

46. The slider of Claim 45 wherein each of the rails includes a rectilinear portion between and adjacent to the V-shaped portion and the trailing edge.

47. The slider of Claim 45 wherein a distance between the narrow part of the V-shaped portion and the wide part of the V-shaped portion is substantially less than a distance between the wide part of the V-shaped portion and the trailing edge.

48. The slider of Claim 40 wherein each of the rails includes a U-shaped portion, a narrow part of the U-shaped portion is the leading edge and a wide part of the U-shaped portion is spaced from the leading edge.

49. The slider of Claim 48 wherein the wide part of the U-shaped portion is spaced from the trailing edge.

50. The slider of Claim 48 wherein each of the rails includes a rectilinear portion between and adjacent to the U-shaped portion and the trailing edge.

51. The slider of Claim 40 wherein each of the rails includes a wedge-shaped portion, a narrow part of the wedge-shaped portion is the leading edge and a wide part of the wedge-shaped portion is spaced from the leading edge.

52. The slider of Claim 51 wherein the wide part of the wedge-shaped portion is spaced from the trailing edge.

53. The slider of Claim 51 wherein each of the rails includes a rectilinear portion between and adjacent to the wedge-shaped portion and the trailing edge, and the narrow part of the wedge-shaped portion is aligned with an inner side of the rectilinear portion and spaced from an outer side of the rectilinear portion.

54. The slider of Claim 40 wherein each of the rails includes a parabolic-shaped portion, a narrow part of the parabolic-shaped portion is the leading edge and a wide part of the parabolic-shaped portion is spaced from the leading edge.

55. The slider of Claim 54 wherein the wide part of the parabolic-shaped portion is spaced from the trailing edge.

56. The slider of Claim 54 wherein each of the rails includes a rectilinear portion between and adjacent to the parabolic-shaped portion and the trailing edge.

57. The slider of Claim 40 wherein each of the rails has a hyperbolic-shaped portion, a narrow part of the hyperbolic-shaped portion is the leading edge and a wide part of the hyperbolic-shaped portion is spaced from the leading edge.

58. The slider of Claim 57 wherein the wide part of the hyperbolic-shaped portion is spaced from the trailing edge.

59. The slider of Claim 57 wherein each of the rails includes a rectilinear portion between and adjacent to the hyperbolic-shaped portion and the trailing edge.

60. The slider of Claim 40 wherein the body has a leading edge that faces into the direction and a trailing edge that faces away from the direction, the leading edge of each of the rails extends to the leading edge of the body, and the trailing edge of each of the rails extends to the trailing edge of the body.

61. The slider of Claim 40 wherein the body has first and second outer side surfaces, the leading edge of the first rail does not extend to the first outer side surface, the trailing edge of the first rail extends to the first outer side surface, the leading edge of the second rail does not extend to the second outer side surface, and the trailing edge of the second rail extends to the second outer side surface.

62. The slider of Claim 40 wherein the tapered width extends across a majority of a distance between the leading and trailing edges.

63. The slider of Claim 40 wherein the tapered width extends across a minority of a distance between the leading and trailing edges.

64. The slider of Claim 40 wherein each of the rails has an inner and outer surface and the leading edge is symmetrically disposed between the inner and outer surfaces.

65. The slider of Claim 40 wherein each of the rails has an inner surface and outer surface and the leading edge is asymmetrically disposed between the inner and outer surfaces.

66. The slider of Claim 40 wherein each of the rails has a uniform thickness between the leading and trailing edges.

67. The slider of Claim 40 wherein each of the rails has a first thickness at the leading edge, a second thickness at the trailing edge, and the first thickness is less than the second thickness.

68. The slider of Claim 40 wherein each of the rails maintains near-contact with the medium during the read and write operations.

69. The slider of Claim 40 wherein each of the rails maintains a near-contact flying height in the range of 1 to 3 microinches during the read and write operations.

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Abstract

The paragraph at page 15, lines 2 to 8 has changed as follows:

A magnetic recording head for reading and writing information with respect to a rotating disk medium includes a pad ~~region~~ having a working surface which contacts the recording medium. The pad ~~region~~ has a leading edge and a trailing edge with the leading edge facing in the general direction of relative motion between the head and the medium. The leading edge has a narrower width than the trailing edge so as to reduce the effect of debris accumulation at the disk-head interface. The narrower leading edge allows the head to deflect oncoming debris as the head traverses the surface of the rotating magnetic medium.

In the Specification

The following paragraph has been inserted at page 2, line 3:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional of U.S. Application Serial No. 09/491,284, filed January 26, 2000, which is a continuation of U.S. Application Serial No. 08/161,234, filed December 2, 1993, which is a continuation-in-part of U.S. Application Serial No. 07/992,270, filed December 14, 1992 (abandoned).

The paragraph at 2, lines 12 to 22 has changed as follows:

Researchers working in the magnetic recording industry have recently begun focusing their efforts on developing thin film heads having a so-called integrated head/flexure/conductor structure for reading and writing of information to a disk medium. For example, such a magnetic head structure is disclosed in U.S. Patent No. 5,041,932. In this type of recording technology, a magnetic pole element is embedded within the body of the magnetic recording head. Advanced performance is achieved in these types

of magnetic recording heads by including a contact pad ~~region~~ which is in non-catastrophic, continuous sliding contact with the surface of the recording medium. The contact pad includes a working surface portion which is extremely small -- on the order or about 20 X 30 **microns**~~μ~~. The working surface portion of the contact pad actually touches the disk during normal operation.

The paragraph at page 3, line 25 to page 4, line 13 has changed as follows:

It should be understood that in the conventional type of magnetic recording head which flies above the surface of the disk (i.e., near-contact recording system), the working surface which touches the disk normally comprises two or more rails having flat bottom surfaces. For example, sliders of this type are disclosed in U.S. Patent No~~'~~s. 4,870,619; 4,961,121; 4,926,274; ~~4,709,274;~~ and 4,709,284. To increase the hydrodynamic lifting force, many sliders have a front taper as described in U.S. Patent No. 4,939,603. Other designs include a sloping working surface. In either case, the taper and/or slope are in the vertical direction; that is, perpendicular to the disk surface. Other prior art designs include the so-called slider camber and crown -- characterized by their vertical slopes in both the longitudinal and cross directions, respectively. This latter type of design is usually selected based on considerations of smaller contact area so as to reduce the problem of stiction. The drawbacks to these designs however include the requirement for a higher take-off velocity and an increased wear rate.

The paragraph at page 8, lines 4 to 13 has changed as follows:

Figure 2 illustrates another type of read/write head structure which also suffers from the problem of excessive debris accumulation at the head-disk interface. The integrated read/write head/flexure/conductor structure 20 shown in Figure 2 comprises an elongated, dielectric flexure body 22 having a pad ~~region~~ 21 disposed at one end. A magnetic pole element is embedded within pad 21 to provide flux-coupling to the magnetic underlayer of the recording medium. Pad 21 also includes a working surface 23 which is in substantially continuous sliding contact with the disk recording medium

during read/write operations. The area of the working surface is usually made to be very small with a typical recording head of this type having a pad area of approximately 30 X 20 microns.

The paragraph at page 9, lines 10 to 20 has changed as follows:

Although Figures 3A and 3B show the entire slider being shaped in an overall triangular or V-shape, it should be understood that in some cases only the front portion or leading section of the contact pad structure may be shaped in this way. In other words, the essential characteristic of the invention is that the leading edge of **the** slider be shaped so as to push away debris as the head slides across the surface of the recording medium. Note that the relative direction of motion of the recording medium is shown in Figures 3A and 3B by arrow 35. Any debris present on the surface of the recording medium is diverted away from the slider-disk interface along the sides of slider 30 in accordance with the present invention. Thus, the shape of the contact pad or slider provides a means for reducing the amount of debris being brought into the friction zone by a hydrodynamic flow.

The paragraph at page 9, line 21 to page 10, line 5 has changed as follows:

Figures 4A and 4B show an alternative embodiment of the present invention in which contact pad 40 includes a leading edge 41 which has a parabolic or U-shape. Trailing edge 43 remains straight. The direction of relative motion between the contact pad and the medium is shown in Figures 4A and 4B by arrow 45. Once again, it is appreciated that the parabolic or U-shaped leading edge faces the direction of sliding. Note also that **it** ~~is~~ makes little difference whether the curved leading edge is actually "U"-shaped, parabolic, hyperbolic, or described by some other mathematical function. It should also be understood that in the embodiments of Figures 3A, 3B, 4A, and 4B, ~~that~~ it may be desirable to taper the leading edges in order to improve the sliding and/or flying characteristics of the head.

The paragraph at page 10, line 25 to page 11, line 6 has changed as follows:

Figures 6A-6C illustrate other alternative embodiments of the present invention wherein the magnetic recording head flies above the surface of the disk. Each of the sliders of Figures 6A-6C **is** ~~are~~ shown having a plurality of rail members, with each rail member providing an air-bearing surface that is approximately parallel to the surface of the disk. In each case, the leading edges of the rail members is shaped so as to reduce the problem of debris accumulation at the disk-slider interface in a manner consistent with the explanation above.

The paragraph at page 11, lines 16 to 21 has changed as follows:

Similarly, in Figure 6B, slider 70 includes rail members 72 each having a leading edge 75 and trailing edge 74. In the case of slider 70, the leading edge portion of the rail members are again shaped to have a "knife-edge" profile, wherein the leading edge 75 is again narrower than the trailing edge 74. The only difference between the embodiment in **Figure** 6A and that shown in **Figure** 6B is that in Figure 6B, the narrower leading edge is symmetrical about the center of the rail.

The paragraph at page 11, line 22 to page 12, line 3 has changed as follows:

Figure 6C shows a third variation of the basic concept of the present invention wherein slider 80 includes rail members 82 each having a leading edge 85 which is narrower than trailing edge 84. In the case of slider 80, leading edge 85 is "U-shaped" to deflect oncoming debris ~~and~~ thereby preventing it from accumulating at the slider-disk interface. It is appreciated that the leading edge 85 of rail members 82 may also be parabolic, hyperbolic, or some other curved surface which can be represented by a mathematical function.

In the Claims

The claims have been amended as follows:

5. (Amended) A slider for supporting a magnetic transducer above the surface of a rotating disk medium, said slider comprising:

a body;

a plurality of rail members extending outward from said body in a direction towards said medium, each of said rail members having a leading and a trailing edge with said leading edge facing in the general direction of relative motion between said **transducer** ~~head~~ and said medium, and wherein said leading edge has a narrower width as compared to said trailing edge;

each of said rail members also having an air-bearing surface which is alternately brought into contact with and separated from said surface of said medium, said air-bearing surface being generally parallel to said surface of said medium.

8. (Amended) The **slider** ~~recording head~~ of Claim 5 wherein each of said rail members has a parabolic shape, with the narrow part of said parabolic shape pointing in said direction.

9. (Amended) The slider of Claim 5 wherein said leading edges are tapered away from said **air-bearing surfaces** ~~working surface~~ to create a lifting effect to maintain said body at a predetermined height above said surface of said medium.

Claims 1-4 have been cancelled, and claims 10-69 have been added.

REMARKS

Claims 5-69 are pending. In this Preliminary Amendment, claims 1-4 have been canceled, claims 5, 8 and 9 have been amended, and claims 10-69 have been added. In addition, the Abstract and Specification have been amended to improve clarity. No new matter has been added.

This application is believed to be in condition for allowance. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

Respectfully submitted,

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